U.S. Environmental Protection Agency
Region 10

RESPONSE TO COMMENTS

Kennecott Greens Creek Mining Company (Greens Creek Mine)
NPDES Permit No.: AK-004320-6

October 1, 1998

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INTRODUCTION

A draft National Pollutant Discharge Elimination System (NPDES) Permit for the Greens Creek Mine, operated by Kennecott Greens Creek Mining Company, was issued for public notice on February 10, 1998. The Public Notice initiated a 30-day public comment period. EPA received comments from William Oelklaus, Environmental Manager, Kennecott Greens Creek Mining Company in a letter dated March 9, 1998 and from David Chambers, Center for Science in Public Participation in a letter dated March 6, 1998.

Information considered by EPA in establishing final permit conditions includes public comments as well as information from actions by the federal agencies and the State of Alaska. The following summarizes the actions and new information that influenced finalization of the permit, comments received, and EPA's responses to the comments.

ACTIONS AND NEW INFORMATION AFTER THE PUBLIC COMMENT PERIOD

National Toxics Rule Removal for Arsenic

NPDES permit limits are established to achieve state water quality criteria in effect at the time of permit issuance. On February 23, 1998, EPA removed the human health criterion for arsenic previously promulgated for Alaska in the 1992 National Toxics Rule (NTR) (63 FR 10140). The draft permit contained effluent limitations for arsenic for Outfall 002 based on the NTR criterion. Since the arsenic NTR criterion is no longer in effect for Alaska, the effluent limits based on the arsenic criterion have been removed from the final permit. The Fact Sheet accompanying the draft permit evaluated whether an arsenic limitation was required using both the NTR criterion and the most stringent of the other applicable criteria (specifically, the marine chronic criterion of 36 ug/l). As described in the Fact Sheet, EPA determined that there is no "reasonable potential" to exceed the marine chronic criterion, therefore arsenic limits are not included in the final permit.

State 401 Certification and CZM Consistency

The state of Alaska issued a 401 certification of the NPDES permit and a Coastal Zone Management (CZM) consistency finding on July 10, 1998. The stipulations of the certification and consistency determination are incorporated into the final NPDES permit and response to comments. The 401 certification authorizes the mixing zones used to determine effluent limits for Outfalls 001 and 002 in the draft permit and includes an antidegradation determination pursuant to the Alaska water quality standards. The 401 certification also stipulates monitoring and reporting

requirements for the receiving water monitoring program and Outfall 002 diffuser inspection.

Endangered Species Consultation

As discussed in the Fact Sheet, the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) identified a number of endangered species that may inhabit the area affected by discharges from the Greens Creek Mine. In accordance with the Endangered Species Act, EPA has conducted informal consultation with USFWS and NMFS regarding effects of the final NPDES permit on the threatened and endangered species. In a Biological Evaluation (September 16, 1998), EPA concluded that reissuance of the NPDES permit is not likely to adversely affect the listed threatened and endangered species. The USFWS and NMFS concurred with this determination in letters dated September 24, 1998 and September 25, 1998, respectively.

COMMENTS RECEIVED ON THE DRAFT PERMIT

Kennecott Greens Creek Mining Company (KGCMC)

The following comments were received from KGCMC in regards to the Draft Permit. For each comment, the specific section of the permit that is the subject of the comment is given in parenthesis.

Comment 1: Outfall 002 Location (Cover Page)

The location of Outfall 002 should be latitude 58º07'0" and longitude 134º45'30".

Response:

The location of Outfall 002 was based on the location provided in the NPDES permit application. The correct location, as specified in the comment, is reflected in the final permit.

Comment 2: pH Range for Outfall 001 (Section I.C.)

KGCMC requested using the same pH range (pH 6 - 9) for both outfalls since: (1) the inclusion of two different ranges sets up the potential for unnecessary confusion which could result in an inadvertent non-compliant discharge, (2) each discharge is into sodium chloride based sea water providing virtually unlimited buffering capacity, and (3) additional treatment (of the Outfall 001 discharge) would be required to maintain the pH.

Response:

The draft permit included effluent limits of pH 6.5 - 8.5 for Outfall 001 and pH 6-9 for

Outfall 002. The limits were different since the State of Alaska Department of Environmental Conservation (ADEC) was expected to authorize a mixing zone for Outfall 002 that would enable an effluent discharged at a pH of 6- 9 (the applicable technology-based effluent guideline pH limitation) to meet the State water quality standards (pH 6.5 - 8.5) at the edge of the mixing zone. At the time the draft permit was issued, a mixing zone for pH for Outfall 001 had not been considered.

Subsequently, in their Section 401 certification, ADEC has determined that, for both outfalls, an effluent discharged at a pH of 6-9 will meet state receiving water criteria of pH 6.5 - 8.5 within a short distance from the outfall. Since the 401 certification allows a mixing zone for pH for Outfall 001 such that state water quality standards will be met at the edge of the mixing zone, the pH limits in the final permit reflect the technology-based limit of pH 6-9. The technology-based limit is based on Alaska wastewater disposal regulations (18 AAC 72) which require secondary treatment. Secondary treatment as defined in 40 CFR 133.102 includes pH in the range of 6.0 - 9.0 standard units (SU).

Comment 3: Editorial Comment (Section I.D).

In section I.D. of the permit, insert "respectively" between "specified" and "in" to clarify that the tables are outfall specific.

Response:

The final permit includes this clarification.

Comment 4: Maximum Daily Limits for Chlorine and Fecal Coliform (Section I, Table 1)

Table 1 includes maximum daily effluent limits for chlorine and fecal coliform for Outfall 001. However, since monitoring of the Outfall 001 discharge is required only once a week, KGCMC suggested that the maximum daily limits should instead be specified as average weekly limits.

Response:

As discussed in the Fact Sheet accompanying the draft permit, the chlorine and fecal coliform effluent limits were based on criteria specified in the Alaska Water Quality Standards for protection of a marine receiving water designated for all uses (18 AAC 70.020.b). The Clean Water Act requires that NPDES permit limits be based on applicable state water quality standards. Per the NPDES regulations, the most stringent of the applicable criteria were used to develop effluent limits. The fecal coliform maximum daily limit (MDL) was based on the criteria for protection of marine water for harvesting for consumption of raw mollusks or other raw aquatic life, specifically: "... not more than 10% of the samples may exceed a fecal coliform median MPN of 43 FC/100 ml". The 43 FC/100 ml (since specified as a "not more than 10%" may exceed) was used as a basis for the MDL.

The chlorine limits were based on the criteria for protection of marine water for

aquaculture, specifically: "Concentrations may not exceed 2.0 ug/l for salmonid fish...". Since the criteria is specified as "not to exceed", it was interpreted as a maximum and used as a basis for calculating the MDL.

During development of the permit, EPA consulted with the State of Alaska regarding interpretation of these criteria. The State concurred with the above interpretations. The MDL is established to protect the receiving water uses regardless of the sampling frequency. Changing an MDL to an average weekly limit (AWL) would allow spikes in concentration which might exceed the MDL to be averaged to meet the AWL. Allowing such spikes would not be protective of the receiving water as defined by the criteria. Therefore, the chlorine and fecal coliform limits are retained as MDLs in the final permit.

Comment 5: Chlorine Limits (Section I., Table 1)

KGCMC requested relief from the chlorine limits for Outfall 001 for the following reasons: (1) the discharge is into the sodium chloride based ocean water, in which free chlorine ions are naturally present; (2) the treatment of the waste streams with chlorine is necessary to reduce the fecal coliform load to meet the fecal coliform NPDES permit limits and additional treatment will be required to meet the chlorine limit; and, (3) KGCMC's drinking water system requires a residual chlorine level of 0.2 mg/l based on human consumption (which is higher than the proposed chlorine effluent limits).

Response:

"Relief" from chlorine limits may occur through granting higher effluent limits (i.e., by allowing a mixing zone) or by issuing a compliance schedule in the permit. The following responds to each of these:

Mixing Zone: As discussed in the Fact Sheet and in response to Comment 4, the chlorine limit is based on the Alaska Water Quality Standards (WQS) and is necessary to protect aquatic life (the higher human health level cited in the comment is not protective of aquatic life). The CWA requires permit limits to be based on state water quality standards. The State of Alaska has certified that the chlorine water quality standard (upon which the effluent limit is based) is applicable at the point of discharge, therefore no relief (via a mixing zone) from the chlorine limit is allowed.

Compliance Schedule: Where authorized by the state in its water quality standards, the NPDES regulations at 40 CFR122.47 allow permits to include schedules of compliance to allow permittees additional time to achieve compliance with water quality-based effluent limits. The Alaska WQS do not currently contain provisions for compliance schedules in permits, therefore a compliance schedule for chlorine can not be included in the permit. EPA understands that KGCMC will be replacing chlorine disinfection with an ozone disinfection system. This should ensure compliance with the chlorine effluent limit. If, following issuance of the permit, the Permittee demonstrates an inability to meet the chlorine limit, then a compliance schedule may be developed (dependent upon

enforcement discretion).

Comment 6: Arsenic Limits and Monitoring (Section I, Tables 2, 4, 5, 6, and 7)

Given EPA Administrator Browner's February 23, 1998 approval granting Alaska relief from the National Toxics Rule (NTR) for arsenic, KGCMC requested that effluent limits and monitoring requirements for arsenic be removed from the permit (based upon the discussion in the fact sheet and footnote 4 of permit Table 2).

Response:

See earlier discussion of the National Toxics Rule removal for arsenic under "Actions and New Information After the Public Comment Period" (page 3). The arsenic effluent limitations and effluent monitoring have been removed from the final permit. EPA and the State have determined that arsenic analyses are no longer required for samples collected in the receiving water (water column, sediments, and in-situ bioassays), so arsenic is not included in the receiving water monitoring list of parameters in the final permit.

Comment 7: Editorial Comment (Section II.D.3).

The final sentence of point "b" appears to refer to both points "a" and "b" of this Section. Therefore shouldn't it stand alone as new point "c"?

Response:

The final sentence of point "b" refers only to point "b". A sentence similar to the final sentence of point "b" is already included under point "a", therefore no changes to the permit language are warranted.

Comment 8: Storm Water Flow Approximation (Sections II.D.3.b and III.D.1)

Item III.D.1. of the permit requires that storm water flow for each location be approximated at the time of sample collection. KGCMC asked whether descriptive estimated ranges such as Light, Moderate, and Heavy are acceptable as approximating the flow.

Response:

The descriptive ranges suggested in the comment are too subjective to be acceptable estimates of flow. Flow should be reported in common units, e.g., cubic feet per second, gallons per minute, etc. There are numerous methods to estimate storm water flow, such as visual estimation by experienced personnel, estimated time to fill a 5-gallon bucket, estimating velocity over a given cross-sectional area, etc. The flow measurement methodology may depend upon site-specific characteristics and circumstances of the storm water discharge, therefore specific methodologies will not be identified in the permit. The Permittee's Storm Water Pollution Prevention Plan (which is part of the BMP Plan) should describe how storm water flow will be estimated.

Comment 9: Clarification Comment (Section II.F).

KGCMC questioned whether the term "authorized representative" refers to potential EPA or ADEC contractors?

Response:

The term "authorized representative" includes EPA and ADEC contractors (see item in parenthesis in Section V.G. of the permit).

Comment 10: Clarification Comment (Section II.F.)

KGCMC questioned which offices of the Permittee are required to keep copies of the BMP Plan and NPDES Permit.

Response:

The NPDES regulations do not specify where copies of the NPDES Permit and supporting documentation (e.g., the BMP Plan, Quality Assurance Plan, etc.) are to be kept. Section II.F. of the permit states that the BMP Plan shall be kept at the facility (i.e., at the Greens Creek Mine site). Likewise, copies of the NPDES Permit should be kept at the Mine Site.

Comment 11: 24-Hour Composite Samples (Section III, Table 4)

KGCMC requested that grab sampling as required in the current permit be retained, rather than switching to 24-hour composite sampling for the following reasons:

- Since monitoring staff are only on the island for 11 hours each day, a machine will be required for collecting samples. Due to power outages or other mechanic breakdowns there is a real potential for some samples to be lost.
- The sample aliquots will have to meet sample handling protocols without staff available 24 hours to relocate these aliquots to such facilities.
- The existing sampling method has worked well at Greens Creek for the last 10+ years.

Response:

The draft permit specifies 24-hour composite samples for metals and whole effluent toxicity (WET) analyses and grab samples for pH, cyanide, and temperature analyses. NPDES regulations do not specify sample collection methods (grab or composite), except that grab samples must be collected for certain parameters that may change during the time necessary for compositing. These parameters include pH, cyanide and temperature, therefore grab sampling was included in the permit for these parameters. For the other parameters, the US EPA NPDES Permit Writers' Manual (EPA-833-B-96-003) recommends that composite samples be collected when the effluent being sampled varies significantly over time, e.g., as a result of flow or quality changes. Composite sampling is more representative than grab sampling. Obtaining a representative sample is particularly important given that the metals samples are only collected on a weekly basis and WET semi-annually.

EPA acknowledges that composite sampling is a change to the current NPDES sampling

program for the Greens Creek Mine; however, other facilities, including mines, in equally or more remote locations have made accommodations to collect composite samples. Because of the desire to obtain representative samples, the final permit retains the requirements for composite sampling.

Comment 12: Editorial Comment (Section III.B.3)

Item "d" is missing from the draft permit.

Response:

The items under Section III.B.3 have been mislabeled. Items "e" through "h" are relabeled as items "d" through "g" in the final permit.

Comment 13: Clarification Comment (Section III.B.4.b)

A complete "list of all chemicals used in operation of the facility" would be confusing. KGCMC suggested that this item be clarified to account for those chemicals which could pose a hazard to human health and/or the environment.

Response:

A "list of all chemicals used in operation of the facility" is one component to be included in the Permittee's Initial Investigation Workplan. The list should include chemicals that may be reported to the effluent either because of ongoing use, overuse, or spillage. The final permit reflects this clarification.

Comment 14: Reporting Deadline for Toxicity Test and In-Situ Bioassay Results (Sections III.B.5.a & b and Section III.C).

KGCMC requested relief from the permit requirement that results of toxicity tests and in-situ bioassays be reported with the DMR for the month in which the samples are taken. Toxicity test and bioassay results are generally received approximately 90 days after the sample is collected. Currently these reports are submitted in a timely manner following their receipt.

Response:

The draft permit required that results of WET tests and the receiving water monitoring program (analyses of the receiving water, sediment, and in-situ bioassays) be reported with the DMR for the month in which the sample was collected. The ADEC certification stipulates that these analyses be submitted with the DMR by the 10th of the **second** month following sample collection (except for water column analyses which are due within 90 days of sample collection). Depending upon the date that the samples were collected, this will allow up to 70 days to submit the data. EPA and ADEC have determined that this is a reasonable time frame consistent with the agencies need to respond to results of such reports in a timely manner. Section III.B.5.a and Section III.C. of the final permit contain revised deadlines to reflect the State certification.

Comment 15: Water Column Monitoring Detection Limits (III.C.Water Column Monitoring)
Battelle Northwest Aquatic Sciences Laboratory, which conducts the receiving water analyses, typically achieves method detection limits (MDLs) one to two orders or magnitude below those listed in Table 5. Therefore, KGCMC suggested that the language under III.C.2 of the draft permit be revised to be less restrictive, e.g., "achieve the MDLs that are equal to or less than those presented in Table 5."

Response:
EPA agrees with the comment. The text of Section III.C.1.b. has been revised accordingly.

Comment 16: Clarification of Sediment Penetration Depth (III.C.Sediment Monitoring)
The second and third sentences of III.C.2 of the draft permit refer to sample penetration depths of two and four centimeters. By requiring twice the acceptable sample depth be collected, some shallow depositions are automatically eliminated from the possibility of sampling.

Response:
The intent of specifying the sediment penetration depth is to ensure that a sufficient amount of sediment is collected to conduct the metals analyses and that the sediment is representative of potential deposition from the discharge. The specifications for exact sediment penetration depths have been removed from the permit. The Quality Assurance Project Plan (QAPP) should identify appropriate sediment sample collection methodology to meet the objectives stated in the first sentence.

Comment 17: Pond D (site 006) Storm Water Sampling (Section III.D, Table 8)
Water from Pond D is continually collected and pumped to the process water stream and does not normally overflow. Therefore, KGCMC suggested that routine (twice yearly) storm water sampling from pond D (storm water site 006) should not be required. KGCMC did acknowledge that, given a significant storm event, overflow from Pond D is still possible and at such times a sample from the overflow will be collected and analyzed. KGCMC suggested that such non-routine analysis are more appropriate under the Non-Routine sampling provisions of the permit.

Response:
Section III.D.1. of the permit requires storm water monitoring twice per year at the locations listed in Table 8. The locations, including location 006, were selected based upon an inspection by ADEC and KGCMC in February of 1997. Therefore, EPA and ADEC have determined that this location should remain in Table 8 of the final permit. Per Section III.D.1. of the permit, in the event of a "dry" fall with low storm water flow, a sample will not be required until the next spring. Although not specified in the permit, if there is no overflow as a result of storm events, then a sample does not need to be collected and this can be noted in the storm water monitoring summary report (Section III.D.4.). Based on the summary reports, the need to continue monitoring storm water

site 006 will be reevaluated at the time of the next permit reissuance.

Comment 18: Clarification Comment (III.F of the draft permit, III.G. of final permit) Paragraph 3 requires collection of samples "...as soon as possible after the spill..." Depending upon the spill site and associated process receiving the spill, transit time of those materials could be as long as 5 to 7 hours or as short as virtually instantaneous. In the event of a bypass, samples are to be collected "...as soon as the bypassed effluent reaches the outfall." KGCMC suggested that this language also be used for the timing of sample collection following a spill.

Response:

The timing of sample collection for a spill vs. a bypass are different. Bypass is defined as the intentional diversion of waste streams from any portion of a treatment facility. The bypassed waste stream will still be discharged through the outfall (and therefore samples shall be collected "as soon as the bypassed effluent reaches the outfall"). However, a spill may or may not flow to or otherwise be collected or routed to the outfall discharge. For example, a spill may instead flow over land into a creek. In which case, sampling the outfall will not be representative of the spill. Therefore, the permit language requiring sampling a spill "as soon as possible after the spill" was not changed.

Comment 19: Electronic DMR Submittal (III.G of draft permit and III.H. of final permit). KGCMC questioned whether the requirements for DMRs to be "...postmarked by the 10th day of the following month." and "...submit the legible originals of these documents..." prevent submittal of the report electronically to EPA and ADEC.

Response:

EPA Region 10 does not currently have the capability to receive electronic DMR submittals, therefore, the DMR must be submitted as a hard copy and signed as described in the permit. In their 401 certification, ADEC stipulated that the permittee shall submit electronic versions, as well as hard copies, of all data. The final permit, therefore, includes a requirement for electronic data submittals.

Comment 20: Retention of Records. (Section III.K. of draft permit and III.L. of final permit) KGCMC commented that if the Director intends requesting extension of the records retention requirement of draft permit Section III.K., adequate notification must be given to KGCMC such that routine records management does not result in records deletions at the time frames specified in this section.

Response:

EPA and ADEC will notify KGCMC of the need to extend the records retention period as soon as possible following identification of that need.

Comment 21: 24-Hour Noncompliance Reporting Phone Number (III.L.1 of draft permit and III.M.1 of final permit)

To insure rapid notification of the appropriate offices under Section L.1. of the draft permit, KGCMC suggested the inclusion of the appropriate phone numbers within the Section text. KGCMC questioned whether the Water Compliance Section phone number listed in Section III.L.3 is the appropriate EPA number to contact for Section III.L.1 issues.

Response:

The phone number listed in Section III.L.3 of the draft permit is the phone number for reporting the specific occurrences of noncompliance as described in Section III.L.1. The final permit includes a reference to this phone number.

Comment 22: Editorial Comment (Section IV.G.3.a(2))

The second sentence in this item requires that backup equipment "shall have" been installed. The basis for this provision appears to be 40 CFR 122.41 (m)(4), which specifies that backup equipment "should have" been installed. KGCMC suggested using the precise regulatory language.

Response:

EPA agrees that the precise regulatory language "should have" is appropriate. The final permit reflects this change.

Comment 23: Clarification Comment (Section IV.H.1)

KGCMC questioned whether the second sentence in the referenced section is saying there is not appealable final agency decision when EPA determines an event to not be an upset unless EPA has commenced "an action for noncompliance".

Response: KGCMC's interpretation of this section is correct.

Comment 24: Clarification Comment (Section V.E.2)

As a point of clarification, on 27 February 1998, KGCMC submitted to EPA, a duly executed letter authorizing the KGCMC Environmental Manager position signatory authority for certifying and submittal of future DMRs.

Response:

Comment noted. No change to the permit.

Comment 25: Editorial Comment (Section V.F.)

KGCMC suggested that since the "state water pollution control agency" and "ADEC" are the same for the state of Alaska, that listing both in this Section is unnecessarily duplicative.

Response:

EPA agrees. The first sentence of Section V.F. in the final permit is revised so that "ADEC" appears in parenthesis following "state water pollution control agency".

Comment 26: Revision of the Fact Sheet

Although KGCMC's comments were directed to the Draft Permit, the same issues appear in the Fact Sheet. KGCMC suggested that the Fact Sheet be revised for the items that are changed in the permit in order for the record to be consistent.

Response:

The Fact Sheet is a final document that provides a basis for the draft permit. The Fact Sheet, therefore, will not be changed. This response to comments document will provide a record of the basis for changes to the draft permit to finalize the permit.

Center for Science in Public Participation (CSPP)

The following comments were received from the CSPP on behalf of the Juneau Audubon Society and the Southeast Alaska Conservation Council.

Comment 27: Outfall 002 Location.

The latitude for outfall 002 is probably mistyped.

Response:

See response to comment 1.

Comment 28: Use of Technology-Based Standards for Outfall 002.

The CSPP pointed out that standards for developing NPDES permit limits can come from a variety of sources, including water quality criteria and technology-based guidelines, and that EPA generally uses the most protective limit from these different standards as the limit in the permit. The CSPP commented that, with the exception of Outfall 001 and arsenic and cyanide for Outfall 002, EPA utilized technology-based limits specified in EPA's New Source performance Standards instead of Alaska's water-quality based standards. The CSPP requested that EPA explain why it has chosen this approach for the Greens Creek permit since it has led to permit limits that are higher than would be expected from a water quality-based approach, especially in regard to Alaska's antidegradation requirements.

Response:

As discussed in Section VI. of the Fact Sheet, in developing permit limits, EPA first determines which technology-based limits are required. For the Greens Creek Mine Outfall 002, the national effluent guidelines found in 40 CFR 440, Subpart J based on best

available technology economically achievable (BAT) and best practicable technology (BPT) are applicable. These guidelines specify limitations for cadmium, copper, lead, mercury, zinc, TSS, and pH. Note, the comment suggested that the technology-based limits were based on the New Source Performance Standards (NSPS). As discussed in Section VI.B.2. of the Fact Sheet, the Greens Creek Mine is not a "new source", therefore the NSPS found in 40 CFR 440.104, do not apply, instead the BAT (440.103) and BPT (440.102) limitations are applicable.

EPA also evaluates whether or not water quality-based limitations are required. This is done by determining whether or not the discharge causes, has the "reasonable potential" to cause, or contributes to an excursion of water quality criteria. Chapter 3 of the *Technical Support Document for Water Quality-Based Toxics Control* (TSD 1991) provides guidance on how to conduct a reasonable potential analysis. EPA followed this guidance to determine reasonable potential for the Outfall 002 discharge. This is described in sections VI.C.3., VI.D., and Appendix B of the Fact Sheet and will not be repeated here. According to the TSD and NPDES regulations (40 CFR 122.44(d)(1)(ii)), when determining the need for water quality-based effluent limits, the permit writer is required to consider the dilution of the effluent in the receiving water. The ADEC has certified a mixing zone for the Outfall 002 discharge that corresponds to a 170:1 dilution. Given this dilution, arsenic was the only metal in the discharge that had a reasonable potential to exceed the most stringent applicable water quality criteria at the edge of the mixing zone. This analysis is clearly described in Appendix B of the Fact Sheet.

For the Outfall 002 discharge, the reasonable potential analysis indicated that water quality-based effluent limits were not required (except for arsenic), therefore, the technology-based limits were included in the permit. In order to verify that allowing a discharge at the technology-based effluent limit concentrations would not exceed water quality standards at the edge of the mixing zone, EPA repeated the reasonable potential calculation using the technology-based effluent limits as the maximum effluent concentrations. This calculation is shown in Attachment A of this Response to Comments. The calculations show that the effluent, even if discharged at concentrations equivalent to the maximum technology-based limit, will not exceed water quality criteria at the edge of the mixing zone.

See response to comment 30, below, regarding the mixing zone for Outfall 002 and Alaska's antidegradation requirements.

Comment 29: pH limits.

For Outfall 001, EPA has chosen to use water quality-based standards to establish the limit for pH. For Outfall 002, the pH limit remains 6 - 9. CSPP commented that EPA should discuss/verify in the Fact Sheet that it expects pH to remain within the Alaska water quality limits of 6.5 - 8.5 at the edge of the mixing zone.

Response:

The pH limits in the draft permit for Outfall 001 were 6.5 to 8.5. The pH limits for Outfall 002 were pH 6-9. In the final permit the effluent limits for both outfalls is pH 6 - 9 (see response to comment 2 regarding the change in the pH limits for Outfall 001). The State 401 certification authorized mixing zones for both outfalls to include pH. This is based on their best professional judgement that due to the instantaneous mixing of the effluent with marine water and the buffering capacity of the marine water, the water quality standards of pH 6.5 - 8.5 would be met at the edge of the mixing zones. The mixing zones for outfalls 001 and 002 represent dilutions of 500:1 and 170:1, respectively.

The Amended Section 301(h) Technical Support Document [301(h) TSD] (EPA 842-B-94-007) provides methodology for determining the change in receiving water pH due to an effluent discharge. The methodology is based on pH-alkalinity modeling that simulates the mixing of effluent with seawater. According to the 301(h) TSD methodology, given the conditions of the Greens Creek discharges, the water quality standard of 6.5 - 8.5 pH will be met at the edge of the mixing zones. This evaluation is provided in Attachment B.

Comment 30: Mixing Zones for Outfall 001 and 002.

Outfall 002: Alaska water quality regulations require that any mixing zone granted by the ADEC be "...as small as practicable." The CSPP commented that EPA and ADEC, in their calculations for the Draft Permit, appear to have used the technology-based standard to determine the discharge limits used in the modeling of the mixing zone. Greens Creek has installed additional treatment capability since the data used in Table B-1 was calculated. Not only does it appear that the technology-based limit was used to calculate the size of the mixing zone rather than the maximum projected receiving water concentration (RWC), but also appears the RWC could be somewhat lower based on the new treatment capability now in place at Greens Creek. In granting a mixing zone for the permit, CSPP stated that EPA should insure that data used to calculate the size of the mixing zone results in the smallest practicable mixing zone, as required by ADEC regulations.

Outfall 001: The Draft Permit explains that "ADEC has tentatively designed a 100 meter mixing zone for...fecal coliform." The CSPP commented that, as with the mixing zone for Outfall 002, it is not apparent from the information in the Fact Sheet whether ADEC is meeting its requirement to minimize the size of this mixing zone.

Response:

ADEC's 401 certification provides rationale for the conditions specified in the certification, including rationale for the size of the mixing zones for Outfall 001 and 002. The mixing zone for Outfall 001 is equivalent to that certified for camps and other small marine discharges. The mixing zone for Outfall 002 is based on the results of discharge modeling under "worst case" site-specific conditions. Maximum metal concentrations in

the effluent (not technology-based limits as suggested in the comment) were used in the modeling. The 300 x 100 foot mixing zone certified for Outfall 002 is much smaller than the 300 x 1000 foot mixing zone certified for the current permit. ADEC required KGCMC to complete a screening level ecological risk assessment for the Outfall 002 discharge. ADEC used this information and the results of ambient monitoring and toxicity tests of the effluent to certify that the mixing zone was as small as practicable. The NPDES regulations allow mixing zones at the discretion of the State. Individual state policy determines whether or not a mixing zone is allowed and constraints (such as size) on mixing zones. ADEC has certified that the mixing zones are as small as practicable and that water quality standards and antidegradation requirements will be met by discharges covered in the NPDES permit. The final permit, therefore, retains the effluent limits based on the mixing zone conditions.

SUMMARY OF CHANGES TO THE DRAFT PERMIT

Following is a summary of changes made to the draft permit as a result of new information and comments received:

Section of Permit	Summary of Change
title page	corrected latitude and longitude of Outfall 002
I.C.	pH limits for Outfall 001 changed to 6.0 - 9.0 SU
I.D.	first sentence revised to read "...the limitations as specified**,** respectively**,** in Tables..."
I.D.	arsenic effluent limitations removed from Table 2
III.A.1.	arsenic monitoring removed from Table 4
III.A.1.	the following is added to Table 4, footnote 4: "The pH shall be measured using a monitor with a 15-minute digital readout, with a continuous strip-chart recorder operated as back-up."
III.A.	item III.A.4. has been added stating "All monitoring results shall be reported to a minimum of 2 significant figures."
III.B.3.	items III.B.3.e. through III.B.3.h. relabeled as III.B.3.d. through III.B.3.g.
III.B.4.b.	the following was added to the end of the sentence: "(i.e., chemicals that may be reported to the effluent due to ongoing use, overuse, or spillage)"
III.B.5.a.	the first sentence, was revised to read "The permittee shall submit the results of the toxicity tests in a toxicity test report, including any accelerated testing conducted during the month, with the discharge monitoring report (DMR) for the second month following sample collection." the end of the second sentence was revised to read: "...the DMR for the second month following the Initial Investigation."
III.B.5.b.	item b. has been deleted (this resulted in relabeling items III.B.5.c. through III.B.5.e.)
III.B.5.c. of draft, B.5.b. of final	item c. was revised to read "The toxicity test report shall..."
III.C.	the subheadings under this section have been numbered

Section of Permit	Summary of Change
III.C.	arsenic monitoring removed from Tables 5, 6, and 7
III.C.Water Column Monitoring of draft; III.C.1 of final	item 2. of draft (item 1.b. of final), the first sentence has been revised to read: "...achieve method detection limits (MDLs) that are equal to or less than those listed in Table 5." item 3. of draft (item 1.c. of final), last sentence has been revised to read "...shall be submitted within 90 days following sample collection." item 4. of draft combined with item 3 (item 1.c. of final)
III.C. Sediment Monitoring of draft; III.C.2. of final	item 2. of draft (item 2.b. of final), the last two sentences deleted item 4. of draft (item 2.d. of final), the last sentence has been revised to read: "...for the second month following sample collection." item 5. of draft combined with item 4 (item 2.d. of final)
III.C.In-Situ Bioassays of draft; III.C.3. of final	item 3. of draft (item 3.c. of final), the last sentence has been revised to read: "...for the second month following sample collection." item 5. of draft combined with item 4 (item 2.d. of final)
III.C.	new section III.C.4. added to include general requirements for receiving water monitoring reporting (item a. requires reporting to a minimum of two significant figures, item b. requires submittal of electronic data to ADEC, and item c. requires submittal of an annual summary report)
III.D.	item III.D.3. has been added stating "All monitoring results shall be reported to a minimum of 2 significant figures." (this resulted in renumbering items III.D.3. and III.D.4)
III.E.3.	item f. added requiring that the QAPP include a description of what will be included in the annual ambient monitoring summary reports
III.	section III.F. added requiring submittal of an annual video and written report of the outfall 002 diffuser, following the annual diffuser inspection (this resulted in relabeling items III.F. through III.N.)

Section of Permit	Summary of Change
III.G. of draft; III.H. of final	in the first paragraph, "...Water Division..." was replaced with "...Office of Water..." the following was added to the end of this section "In addition to submitting hard copies, the permittee shall also submit electronic versions of the DMRs to ADEC in a format agreeable to both the permittee and ADEC."
III.L.1. of draft; III.M.1 of final	the first sentence has been revised to read "...noncompliance by telephone (see M.3., below) within..."
IV.G.3.a.(2)	in the second sentence "shall" has been replaced with "should"
V.F.	the end of the first sentence was revised to read "...state water pollution control agency (ADEC) and the Director."

ATTACHMENT A

Determination of Potential to Exceed Water Quality Standards for Outfall 002 (additional information for response to comment 28 on the draft permit)

In order to verify that allowing discharge of Outfall 002 at technology-based effluent limits would not result in a violation of water quality standards, a reasonable potential calculation was performed using the maximum technology-based effluent limit as the maximum projected effluent concentration. The calculation takes into account background concentrations and dilution afforded by the state certified mixing zone. The calculations indicate that effluent discharged at the technology-based limits would not result in an exceedence of the most stringent water quality criteria at the edge of the mixing zone. The calculations are described in the following table:

Parameter	background receiving water concentration (from Table B-1 of Fact Sheet)	maximum technology-based effluent limit (from Table 2 of Permit)	maximum projected receiving water concentration *	most stringent water quality criteria (from Table 2 of Fact Sheet)	will discharge at technology-based effluent limit exceed water quality criteria? (is value in column 5 > value in column 4)
cadmium	0.08	100	0.67	9.3	no
copper	0.6	300	2.4	2.9	no
lead	0.106	600	3.6	5.6	no
mercury	0.0008	2.0	0.012	0.025	no
zinc	1.47	1000	7.3	58	no

***** - max. projected receiving water concentration = (limit/dilution) + background.
since state-approved mixing zone is equivalent to a 170:1 dilution,
max. projected receiving water concentration = (value in column 3)/170 + (value in column 2)

ATTACHMENT B

Receiving Water pH Values After Effluent Dilution
(additional information for response to comment 29 on the draft permit)

As discussed in response to comment 29, Table 1 (attached) estimates the pH value of a seawater receiving water after discharge and dilution of an effluent. All of the calculated receiving water pH values following effluent dilution in Table 1 are within the range of pH 6.5 to 8.5. The pH values in Table 1 are dependent upon the receiving water pH and temperature and the effluent pH and alkalinity. Typical Hawk Inlet water and Greens Creek effluent fall within the numerical range for these parameters included in Table 1 (see table, below). Therefore, the Hawk Inlet receiving water pH should be within the range of pHs estimated in Table 1 (pH 6.5 to 8.5) following effluent dilution. This prediction is strengthened since the dilution allowed for the Greens Creek outfalls (170:1 and 500:1) are much greater than the range included in Table 1 (up to 100:1).

The following compares values in Table 1 to conditions for the Greens Creek discharges:

Parameter	Table 1 Conditions	Greens Creek Conditions
seawater temperature, °C	5 - 25	3.4 - 12 **(1)**
seawater pH	7 - 8.5	8.2 - 8.3 **(1)**
effluent pH	6 - 9	6 - 9 **(2)**
effluent alkalinity, meq/l	0.1 - 6	1.2 - 1.6 for Outfall 002 **(3)**
dilution	10 - 100	500 for Outfall 001 170 for Outfall 002 **(4)**

Footnotes:
(1) Based on ambient monitoring at Hawk Inlet Site 106.
(2) Effluent pH limitations.
(3) Based on alkalinity measurements conducted as part of toxicity tests. No alkalinity data available for Outfall 001. For a municipal effluent with no industrial components (e.g., Outfall 001) an alkalinity of 0.1 meq/l is typical.
(4) Based on State 401 Certification.

FROM: AMENDED SECTION 301(h) TECHNICAL SUPPORT DOCUMENT (EPA 842-B-94-007). SECTION III. B.5

CHANGE IN RECEIVING WATER pH FOLLOWING DILUTION OF DISCHARGE.

TABLE 1. ESTIMATED pH VALUES AFTER INITIAL DILUTION

Seawater Temp.	5 °C					15 °C					25 °C				
Seawater pH	Initial Dilution														
	10	25	50	75	100	10	25	50	75	100	10	25	50	75	100
Effluent pH = 6.0 Alk = 0.1															
7.00	6.97	6.98	6.99	6.99	6.99	6.97	6.99	6.99	6.99	6.99	6.97	6.99	6.99	6.99	6.99
7.50	7.40	7.46	7.48	7.48	7.49	7.42	7.47	7.48	7.49	7.49	7.43	7.47	7.48	7.49	7.49
7.70	7.58	7.65	7.67	7.68	7.68	7.61	7.66	7.68	7.69	7.69	7.63	7.67	7.68	7.69	7.69
8.00	7.89	7.96	7.98	7.98	7.99	7.93	7.97	7.99	7.99	7.99	7.96	7.98	7.99	7.99	7.99
8.30	8.23	8.27	8.28	8.29	8.29	8.27	8.29	8.29	8.29	8.29	8.28	8.29	8.29	8.29	8.29
8.50	8.46	8.48	8.49	8.49	8.49	8.48	8.49	8.49	8.49	8.49	8.49	8.49	8.49	8.49	8.49
Effluent pH = 6.0 Alk = 0.6															
7.00	6.80	6.91	6.95	6.96	6.97	6.80	6.91	6.95	6.96	6.97	6.80	6.91	6.95	6.97	6.97
7.50	7.05	7.28	7.38	7.42	7.43	7.07	7.30	7.39	7.42	7.44	7.09	7.32	7.40	7.43	7.45
7.70	7.13	7.42	7.55	7.60	7.62	7.18	7.46	7.58	7.62	7.64	7.22	7.50	7.60	7.63	7.65
8.00	7.29	7.69	7.85	7.90	7.92	7.40	7.78	7.90	7.93	7.95	7.53	7.84	7.92	7.95	7.96
8.30	7.57	8.06	8.19	8.23	8.24	7.82	8.15	8.23	8.25	8.26	7.98	8.19	8.25	8.26	8.27
8.50	7.90	8.32	8.41	8.44	8.46	8.15	8.38	8.44	8.46	8.47	8.25	8.41	8.46	8.47	8.48
Effluent pH = 6.0 Alk = 1.0															
7.00	6.70	6.85	6.92	6.94	6.96	6.70	6.86	6.92	6.94	6.96	6.71	6.86	6.92	6.95	6.96
7.50	6.89	7.17	7.31	7.37	7.40	6.90	7.19	7.33	7.38	7.41	6.92	7.21	7.34	7.39	7.42
7.70	6.94	7.28	7.46	7.54	7.57	6.97	7.33	7.50	7.56	7.60	7.01	7.38	7.53	7.59	7.62
8.00	7.04	7.50	7.74	7.83	7.87	7.12	7.62	7.82	7.88	7.91	7.22	7.71	7.87	7.91	7.93
8.30	7.20	7.86	8.11	8.18	8.21	7.40	8.02	8.17	8.22	8.24	7.65	8.10	8.21	8.24	8.25
8.50	7.39	8.17	8.35	8.40	8.43	7.77	8.29	8.40	8.43	8.45	8.01	8.34	8.42	8.45	8.46
Effluent pH = 6.0 Alk = 2.0															
7.00	6.53	6.75	6.85	6.90	6.92	6.53	6.75	6.86	6.90	6.92	6.54	6.75	6.86	6.90	6.92
7.50	6.64	6.97	7.17	7.26	7.31	6.65	6.99	7.19	7.28	7.33	6.67	7.01	7.21	7.30	7.34
7.70	6.67	7.04	7.28	7.40	7.46	6.69	7.08	7.33	7.44	7.50	6.71	7.12	7.38	7.48	7.53
8.00	6.72	7.17	7.50	7.66	7.74	6.76	7.27	7.62	7.75	7.82	6.81	7.39	7.71	7.82	7.86
8.30	6.79	7.39	7.87	8.03	8.11	6.88	7.64	8.02	8.12	8.17	6.99	7.84	8.10	8.17	8.20
8.50	6.86	7.67	8.17	8.29	8.35	7.01	8.00	8.28	8.36	8.40	7.23	8.15	8.34	8.39	8.42
Effluent pH = 6.5 Alk = 0.5															
7.00	6.95	6.98	6.99	6.99	6.99	6.95	6.98	6.99	6.99	6.99	6.95	6.98	6.99	6.99	6.99
7.50	7.35	7.44	7.47	7.48	7.48	7.37	7.45	7.47	7.48	7.48	7.39	7.45	7.47	7.48	7.48
7.70	7.52	7.62	7.66	7.67	7.68	7.55	7.64	7.67	7.68	7.68	7.58	7.65	7.67	7.68	7.69
8.00	7.81	7.93	7.96	7.97	7.98	7.87	7.95	7.97	7.98	7.98	7.91	7.97	7.98	7.99	7.99
8.30	8.16	8.25	8.27	8.28	8.28	8.22	8.27	8.28	8.29	8.29	8.24	8.28	8.29	8.29	8.29
8.50	8.40	8.46	8.48	8.48	8.49	8.44	8.47	8.49	8.49	8.49	8.46	8.48	8.49	8.49	8.49
Effluent pH = 6.5 Alk = 1.0															
7.00	6.90	6.95	6.97	6.98	6.98	6.90	6.96	6.98	6.98	6.98	6.90	6.96	6.98	6.98	6.99
7.50	7.23	7.38	7.43	7.45	7.46	7.25	7.39	7.44	7.46	7.47	7.27	7.40	7.45	7.46	7.47
7.70	7.35	7.55	7.62	7.65	7.66	7.40	7.58	7.64	7.66	7.67	7.44	7.60	7.65	7.66	7.67
8.00	7.59	7.84	7.92	7.95	7.96	7.70	7.89	7.95	7.96	7.97	7.78	7.92	7.96	7.97	7.98
8.30	7.96	8.18	8.24	8.26	8.27	8.09	8.22	8.26	8.27	8.28	8.15	8.24	8.27	8.28	8.28
8.50	8.24	8.41	8.45	8.47	8.48	8.33	8.44	8.47	8.48	8.48	8.38	8.45	8.47	8.48	8.48

TABLE 1. (Continued)

Seawater Temp.	5 °C					15 °C					25 °C				
Seawater pH	Initial Dilution 10	25	50	75	100	10	25	50	75	100	10	25	50	75	100
						Effluent pH = 6.5 Alk = 2.0									
7.00	6.82	6.91	6.95	6.97	6.97	6.82	6.91	6.95	6.97	6.97	6.82	6.92	6.95	6.97	6.97
7.50	7.06	7.28	7.38	7.41	7.43	7.08	7.29	7.39	7.42	7.44	7.10	7.31	7.40	7.43	7.45
7.70	7.14	7.42	7.55	7.59	7.62	7.18	7.46	7.57	7.61	7.63	7.22	7.49	7.60	7.63	7.65
8.00	7.28	7.68	7.84	7.89	7.92	7.39	7.76	7.89	7.92	7.94	7.50	7.82	7.91	7.94	7.96
8.30	7.54	8.04	8.18	8.22	8.24	7.78	8.13	8.22	8.24	8.26	7.93	8.17	8.24	8.26	8.27
8.50	7.85	8.30	8.40	8.44	8.45	8.10	8.36	8.43	8.45	8.46	8.21	8.39	8.45	8.46	8.47
						Effluent pH = 9.0 Alk = 2.0									
7.00	7.06	7.02	7.01	7.00	7.00	7.06	7.02	7.01	7.00	7.00	7.07	7.02	7.01	7.00	7.00
7.50	7.56	7.52	7.51	7.50	7.50	7.56	7.52	7.51	7.50	7.50	7.56	7.52	7.51	7.50	7.50
7.70	7.75	7.72	7.70	7.70	7.70	7.75	7.72	7.71	7.70	7.70	7.75	7.72	7.71	7.70	7.70
8.00	8.03	8.01	8.00	8.00	8.00	8.03	8.01	8.00	8.00	8.00	8.03	8.01	8.00	8.00	8.00
8.30	8.31	8.30	8.30	8.30	8.30	8.31	8.30	8.30	8.30	8.30	8.31	8.30	8.30	8.30	8.30
8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.49	8.49
						Effluent pH = 9.0 Alk = 4.0									
7.00	7.10	7.04	7.02	7.01	7.00	7.10	7.04	7.02	7.01	7.01	7.11	7.04	7.02	7.01	7.01
7.50	7.59	7.53	7.51	7.51	7.50	7.59	7.53	7.51	7.51	7.50	7.59	7.53	7.51	7.51	7.50
7.70	7.76	7.72	7.71	7.70	7.70	7.76	7.72	7.71	7.70	7.70	7.76	7.72	7.71	7.70	7.70
8.00	8.02	8.01	8.00	8.00	8.00	8.02	8.00	8.00	8.00	8.00	8.02	8.00	8.00	8.00	8.00
8.30	8.29	8.29	8.29	8.29	8.29	8.28	8.29	8.29	8.29	8.29	8.28	8.29	8.29	8.29	8.29
8.50	8.47	8.48	8.49	8.49	8.49	8.46	8.48	8.49	8.49	8.49	8.46	8.48	8.49	8.49	8.49
						Effluent pH = 9.0 Alk = 6.0									
7.00	7.14	7.05	7.02	7.01	7.01	7.14	7.05	7.02	7.01	7.01	7.15	7.06	7.03	7.02	7.01
7.50	7.61	7.54	7.52	7.51	7.51	7.61	7.54	7.52	7.51	7.51	7.61	7.54	7.52	7.51	7.51
7.70	7.78	7.73	7.71	7.71	7.70	7.77	7.73	7.71	7.71	7.70	7.77	7.73	7.71	7.71	7.70
8.00	8.02	8.00	8.00	8.00	8.00	8.01	8.00	8.00	8.00	8.00	8.01	8.00	8.00	8.00	8.00
8.30	8.27	8.28	8.29	8.29	8.29	8.26	8.28	8.29	8.29	8.29	8.26	8.28	8.29	8.29	8.29
8.50	8.44	8.47	8.48	8.49	8.49	8.43	8.47	8.48	8.49	8.49	8.43	8.47	8.48	8.48	8.49

based on a seawater alkalinity of 2.3 meq/L (Stumm and Morgan 1981) and dissociation constants from Stumm and Morgan (1981) and Dickson and Riley (1979).

Effluent alkalinity depends on the alkalinity of the source water and any infiltrating water, the type of treatment process, and the volume and type of industrial waste that enters the treatment plant. Effluent alkalinity can range from 0 to 6.0 meq/L. A typical value for effluent alkalinity is 2 meq/L or higher (Metcalf and Eddy 1979). Because alkalinity data are scarce, final pH values calculated for a range of alkalinities are provided in Table 1. If significant industrial waste is present in an effluent, or if pure oxygen or nitrification-denitrification treatment processes are used, effluent pH and alkalinity should be measured. For cases of weak